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## CLAIMS:

1. A cellulosic based substrate or matrix for controlling flying insects, the cellulosic based substrate or matrix impregnated and/or dosed with a vapour active pyrethroid in a carrier solvent,
  - wherein the cellulosic based substrate or matrix has a surface area in the range of 50–5000 cm<sup>2</sup>, the vapour active pyrethroid is selected from the group consisting of metofluthrin, transfluthrin, empenthrin, methothrin, tefluthrin, and fenfluthrin or mixtures thereof and is present in an amount of approximately 2.0-3000 mg/m<sup>2</sup>, and the carrier solvent has an evaporation rate according to ASTM D3539-87 of less than approximately 1.0, a boiling point range at or above about 120°C to below about 300°C and a Snyder polarity index in the range of approximately 0.0-4.0;
  - such that the vapour active pyrethroid is emanated into an environment with non-augmented air movement at a rate of at least approximately 0.040 mg/h at a temperature in the range of approximately 18-40°C.
2. The cellulosic based substrate or matrix according to claim 1, wherein the solvent is selected from the group consisting of normal paraffins with a boiling point range of about 155-276°C, dearomatised aliphatic hydrocarbons and their blends in the boiling point range of about 150-265°C, isoparaffins in the boiling point range of about 150-300°C and glycol ethers in the boiling point range of about 120-243°C.
3. The cellulosic based substrate or matrix according to claim 1 or 2 wherein the carrier solvent has a boiling point in the range of approximately 150-265°C.
4. A cellulosic based substrate or matrix for controlling flying insects, the cellulosic based substrate or matrix impregnated and/or dosed with an insecticidally effective amount of a vapour active pyrethroid in a carrier solvent, wherein the vapour active pyrethroid is selected from the group consisting of metofluthrin, transfluthrin, empenthrin, methothrin, tefluthrin, and fenfluthrin or mixtures thereof and the carrier solvent has an evaporation rate according to ASTM D3539-87 of less than approximately 1.0, a boiling point range at or above about 120°C to below about 300°C and a polarity index in the range of



approximately 0.0-4.0, such that the vapour active pyrethroid is emanated into the environment at a rate of at least approximately 0.040 mg/h.

5. The cellulosic based substrate or matrix according to claim 4, wherein the  
5 vapour active pyrethroid is metofluthrin.

6. The cellulosic based substrate or matrix according to any one of claims 1-5  
wherein the cellulosic based substrate or matrix is impregnated and/or dosed  
with a vapour active pyrethroid in an amount of approximately 16-320 mg/m<sup>2</sup>  
10 of the substrate or matrix surface area

7. The cellulosic based substrate or matrix according to claim 6 wherein the  
vapour active pyrethroid is in an amount of approximately 130-320 mg/m<sup>2</sup>.

15. 8. The cellulosic based substrate or matrix according to any one of claims 1-5  
wherein the cellulosic based substrate or matrix is impregnated and/or dosed  
with a vapour active pyrethroid in an amount of approximately 48-960 mg/m<sup>2</sup>  
of the substrate or matrix surface area.

20. 9. The cellulosic based substrate or matrix according to claim 8 wherein the  
vapour active pyrethroid is in an amount of approximately 390-960 mg/m<sup>2</sup>.

10. The cellulosic based substrate or matrix according to any one of claims 1-5  
wherein the cellulosic based substrate or matrix is impregnated and/or dosed  
25 with a vapour active pyrethroid in an amount of approximately 144-2880  
mg/m<sup>2</sup> of the substrate or matrix surface area.

11. The cellulosic based substrate or matrix according to claim 10 wherein the  
vapour active pyrethroid is in an amount of approximately 1170-2880 mg/m<sup>2</sup>.

30 12. The cellulosic based substrate or matrix according to any one of claims 1-  
11 wherein the vapour active pyrethroid is emanated into the environment at a  
temperature in the range of approximately 21-40°C.

13. The cellulosic based substrate or matrix according to any one of claims 1 to 12 wherein the vapour active pyrethroid is emanated into the environment at a rate of at least approximately 0.075 mg/h.
- 5 14. The cellulosic based substrate or matrix according to any one of claims 1-13 wherein the vapour active pyrethroid is emanated into the environment at a rate of at least approximately 0.075 mg/h at a temperature in the range of approximately 21-35 °C.
- 10 15. The cellulosic based substrate or matrix according to any one of claims 1 to 14 wherein the cellulosic based substrate or matrix has a grammage in the range of approximately 12 gsm to less than 260 gsm.
- 15 16. The cellulosic based substrate or matrix according to claim 15, wherein the cellulosic based substrate or matrix has a grammage of approximately 18 gsm to 40 gsm.
- 20 17. The cellulosic based substrate or matrix according to any one of claims 1 to 16 wherein the cellulosic based substrate or matrix is a paper substrate having a grammage of approximately 18 gsm.
18. The cellulosic based substrate or matrix according to any one of claims 1 to 17, wherein the cellulosic based substrate or matrix is in the form of a honeycomb arrangement.
- 25 19. The cellulosic based substrate or matrix according to claim 18, wherein the honeycomb arrangement has two ends that are attached to a protective material into which the vapour active pyrethroid cannot migrate and/or be absorbed.
- 30 20. The cellulosic based substrate or matrix according to claim 19, wherein the honeycomb arrangement has an open form that allows emanation of the vapour active pyrethroid into the atmosphere and a closed form which inhibits migration and/or absorption of the vapour active pyrethroid into the atmosphere.

21. The cellulosic based substrate or matrix according to any one of claims 1-20 wherein the flying insects are controlled by knockdown.

22. The cellulosic based substrate or matrix according to any one of claims 1-21  
5 wherein the flying insects are mosquitoes.

23 A flying insect control article comprising:

a) a cellulosic based substrate or matrix with a surface area in the range of 50-5000 cm<sup>2</sup> impregnated and/or dosed with a solution of vapour active pyrethroid in an amount of approximately 2.0-3000 mg/m<sup>2</sup> in a carrier solvent, wherein the vapour active pyrethroid is selected from the group consisting of metofluthrin, transfluthrin, empenthrin, methothrin, tefluthrin, and fenfluthrin or mixtures thereof and the carrier solvent has an evaporation rate according to ASTM D3539-87 of less than approximately 1.0, a boiling point range at or above about 120°C to below about 300°C and a Snyder polarity index in the range of approximately 0.0-4.0;

the cellulosic based substrate or matrix impregnated and/or dosed with the vapour active pyrethroid in an amount such that the vapour active pyrethroid is emanated into an environment with non-augmented air movement at a rate of at least approximately 0.040 mg/h at a temperature in the range of approximately 18-40°C; and

b) a protective material that is attached to the cellulosic based substrate or matrix into which protective material the vapour active pyrethroid does not migrate and/or is not absorbed;

25 wherein the cellulosic based substrate and/or matrix exists in a closed and open form such that when in the open form the pyrethroid is able to emanate from the substrate into the environment and when in the closed form the protective material covers the substrate or matrix to minimise emanation of the pyrethroid into the environment.

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24. The insect control article according to claim 23 wherein the solvent is selected from the group consisting of normal paraffins with a boiling point range of about 155-276°C, dearomatised aliphatic hydrocarbons and their blends in the boiling point range of about 150-265°C, isoparaffins in the boiling point range of about 150-300°C and glycol ethers in the boiling point range of about 120-243°C.

25. The insect control article according to claim 23 or 24 wherein the carrier solvent has a boiling point in the range of approximately 150-265°C.

5 26. A flying insect control article comprising:

- a) a cellulosic based substrate or matrix for controlling flying insects, the cellulosic based substrate or matrix impregnated and/or dosed with an insecticidally effective amount of a vapour active pyrethroid in a carrier solvent, wherein the vapour active pyrethroid is selected from the group consisting of

10 metofluthrin, transfluthrin, empenthrin, methothrin, tefluthrin, and fenfluthrin or mixtures thereof and the carrier solvent has an evaporation rate according to ASTM D3539-87 of less than approximately 1.0, a boiling point range at or above about 120°C to below about 300°C and a polarity index in the range of approximately 0.0-4.0 such that the vapour active pyrethroid is emanated into

15 the environment at a rate of at least approximately 0.040 mg/h; and

- b) a protective material that is attached to the cellulosic based substrate or matrix into which protective material the vapour active pyrethroid does not migrate and/or is not absorbed;

wherein the cellulosic based substrate and/or matrix exists in a closed

20 and open form such that when in the open form the pyrethroid is able to emanate from the substrate into the environment and when in the closed form the protective material covers the substrate or matrix to minimise emanation of the pyrethroid into the environment.

25 27. The insect control article according to claim 26, wherein the vapour active pyrethroid is metofluthrin

28. The insect control article according to claim 26 or 27, wherein the cellulosic based substrate or matrix is in the form of a honeycomb arrangement.

30 29. The insect control article according to claim 28, wherein the honeycomb arrangement has two ends that are attached to the protective material.

30. A packaged flying insect control article comprising:

- a) a cellulosic based substrate or matrix with a surface area in the range of 50-5000 cm<sup>2</sup> impregnated and/or dosed with a solution of vapour active

pyrethroid in an amount of approximately 2.0-3000 mg/m<sup>2</sup> in a carrier solvent, wherein the vapour active pyrethroid is selected from the group consisting of metofluthrin, transfluthrin, empenthrin, methothrin, tefluthrin, and fenfluthrin or mixtures thereof and the carrier solvent has an evaporation rate according to 5 ASTM D3539-87 of less than approximately 1.0, a boiling point range at or above about 120°C to below about 300°C and a Snyder polarity index in the range of approximately 0.0-4.0;

the cellulosic based substrate or matrix impregnated and/or dosed with the vapour active pyrethroid in an amount such that the vapour active 10 pyrethroid is emanated into a non-augmented environment at a rate of at least approximately 0.040 mg/h at a temperature in the range of approximately 18-40°C; and

b) a packaging material enclosing the cellulosic based substrate or matrix into which material the vapour active pyrethroid does not migrate and/or is not 15 absorbed;

wherein when the packaging material enclosing the cellulosic based substrate or matrix is removed from around the cellulosic based substrate or matrix, the vapour active pyrethroid is free to emanate from the cellulosic based substrate or matrix exposed to the environment to control flying insects.

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31. The insect control device according claim 30 whereirr the solvent is selected from the group consisting of normal paraffins with a boiling point range of about 155-276°C, dearomatised aliphatic hydrocarbons and their blends in the boiling point range of about 150-265°C, isoparaffins in the boiling 25 point range of about 150-300°C and glycol ethers in the boiling point range of about 120-243°C.

32. The packaged flying insect control article according to claim 30 or 31 wherein the carrier solvent has an evaporation rate according to ASTM D3539-30 87 of less than approximately 1.0, a boiling point in the range of approximately 150-265°C.

33. A packaged flying insect control article comprising:  
a) a cellulosic based substrate or matrix for controlling flying insects, the 35 cellulosic based substrate or matrix impregnated and/or dosed with an insecticidally effective amount of a vapour active pyrethroid in a carrier solvent,

wherein the vapour active pyrethroid is selected from the group consisting of metofluthrin, transfluthrin, empenthrin, methothrin, tefluthrin, and fenfluthrin or mixtures thereof and the carrier solvent has an evaporation rate according to ASTM D3539-87 of less than approximately 1.0, a boiling point range at or

- 5 above about 120°C to below about 300°C and a polarity index in the range of approximately 0.0-4.0 such that the vapour active pyrethroid is emanated into the environment at a rate of at least approximately 0.040 mg/h; and
- b) a packaging material enclosing the cellulosic based substrate or matrix into which material the vapour active pyrethroid does not migrate and/or is not
- 10 absorbed;

wherein when the packaging material enclosing the cellulosic based substrate or matrix is removed from around the cellulosic based substrate or matrix, the vapour active pyrethroid is free to emanate from the cellulosic based substrate or matrix exposed to the environment to control flying insects.

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34. The insect control device according to claim 33, wherein the vapour active pyrethroid is metofluthrin.

35. A stable flying insect control article comprising:

- 20 a cellulosic based substrate or matrix with a surface area in the range of 50-5000 cm<sup>2</sup>, wet with a solution of vapour active pyrethroid in an amount of approximately 2.0-3000 mg/m<sup>2</sup> of the surface area and a carrier solvent, enclosed by a packaging material;

wherein the vapour active pyrethroid is selected from the group  
25 consisting of metofluthrin, transfluthrin, empenthrin, methothrin, tefluthrin, and fenfluthrin or mixtures thereof and the carrier solvent has an evaporation rate according to ASTM D3539-87 of less than approximately 1.0, a boiling point range at or above about 120°C to below about 300°C and a Snyder polarity index in the range of approximately 0.0-4.0;

- 30 such that the vapour active pyrethroid emanates from the cellulosic substrate or matrix into a non-augmented environment at a rate of at least approximately 0.040 mg/h at a temperature in the range of approximately 18-40°C but does not migrate and/or is not absorbed into the packaging material.

- 35 36. The insect control article according to any one of claims 41-42 wherein the solvent is selected from the group consisting of normal paraffins with a boiling

point range of about 155-276°C, dearomatised aliphatic hydrocarbons and their blends in the boiling point range of about 150 -265°C, isoparaffins in the boiling point range of about 150-300°C and glycol ethers in the boiling point range of about 120-243°C.

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37. The stable flying insect control article according to claim 35 or 36 wherein the carrier solvent has a boiling point in the range of approximately 150-265°C.

38. A stable flying insect control article comprising:

10 a cellulosic based substrate or matrix wet with a solution of an insecticidally effective amount of a vapour active pyrethroid selected from the group consisting of metofluthrin, transfluthrin, empenthrin, methothrin, tefluthrin, and fenfluthrin or mixtures thereof and a carrier solvent having an evaporation rate according to ASTM D3539-87 of less than approximately 1.0, a  
15 boiling point range at or above about 120°C to below about 300°C and a polarity index in the range of approximately 0.0-4.0, enclosed by a packaging material;

wherein the vapour active pyrethroid emanates from the cellulosic substrate or matrix into the environment at a rate of at least approximately 20 0.040 mg/h but does not migrate and/or is not absorbed into the packaging material.

39. The insect control article according to claim 38, wherein the vapour active pyrethroid is metofluthrin.

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40. The insect control article according to any one of claims 23 to 39 wherein the vapour active pyrethroid is emanated into the atmosphere at a rate of at least approximately 0.075 mg/h at a temperature in the range of about 21-35°C.

30 41. The insect control article according to any one of claims 23 to 40 wherein the cellulosic based substrate or matrix has a grammage within the range of approximately 12 gsm to less than 260 gsm.

35 42. The insect control article according to any one of claims 23 to 41 wherein the cellulosic based substrate or matrix is a paper substrate with a grammage of about 18 gsm.

43. The packaged insect control device or insect control article according to any one of claims 30 to 39, wherein the cellulosic based substrate or matrix is in the form of a paper honeycomb arrangement.

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44. The insect control device according to claim 43, wherein the honeycomb arrangement has two ends that are attached to material through which the vapour active pyrethroid cannot migrate.

10 45. The insect control device according to claim 44, wherein the honeycomb arrangement has an open form that allows emanation of the vapour active pyrethroid into the atmosphere and a closed form which inhibits migration of the vapour active pyrethroid into the atmosphere.

15 46. The insect control article according to any one of claims 23 to 45, wherein the protective material and packaging material is selected from the group including metalised polyester, heat sealed polyester films, polyester based film and formed sheet and acrylonitrile-methyl acrylate copolymers and laminates thereof.

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47. The insect control article according to any one of claims 23 to 45, wherein the protective material and packaging material is metal foil and laminates thereof.

25 48. The insect control article according to any one of claims 23 to 45, wherein the protective material and packaging material is glass.

49. A flying insect control article comprising:

a) a cellulosic based substrate or matrix with a surface area in the range of 30 50-5000 cm<sup>2</sup> impregnated and/or dosed with a solution of vapour active pyrethroid in an amount of approximately 2.0-3000 mg/m<sup>2</sup> in a carrier solvent, the cellulosic based substrate or matrix impregnated and/or dosed with the vapour active pyrethroid in an amount such that the vapour active pyrethroid is emanated into an environment with non-augmented air movement at a rate of 35 at least approximately 0.040 mg/h at a temperature in the range of approximately 18-40°C; and

b) a protective material that is attached to the cellulosic based substrate or matrix into which protective material the vapour active pyrethroid does not migrate and/or is not absorbed;

wherein

5 the protective material and packaging material is selected from the group including metalised polyester, heat sealed polyester films, polyester based film and formed sheet and acrylonitrile-methyl acrylate copolymers and laminates thereof; metal foil and laminates thereof; and glass; and

10 the cellulosic based substrate and/or matrix exists in a closed and open form such that when in the open form the pyrethroid is able to emanate from the substrate into the environment and when in the closed form the protective material covers the substrate or matrix to minimise emanation of the pyrethroid into the environment.

15 50. A flying insect control article comprising:

a) a cellulosic based substrate or matrix for controlling flying insects, the cellulosic based substrate or matrix impregnated and/or dosed with an insecticidally effective amount of a vapour active pyrethroid in a carrier solvent, wherein the carrier solvent has an evaporation rate according to ASTM D3539-  
20 87 of less than approximately 1.0, a boiling point range at or above about 120°C to below about 300°C and a polarity index in the range of approximately 0.0-4.0 such that the vapour active pyrethroid is emanated into the environment at a rate of at least approximately 0.040 mg/h; and

25 b) a protective material that is attached to the cellulosic based substrate or matrix into which protective material the vapour active pyrethroid does not migrate and/or is not absorbed;

wherein

the protective material and packaging material is selected from the group including metalised polyester, heat sealed polyester films, polyester based film  
30 and formed sheet and acrylonitrile-methyl acrylate copolymers and laminates thereof; metal foil and laminates thereof; and glass; and

35 the cellulosic based substrate and/or matrix exists in a closed and open form such that when in the open form the pyrethroid is able to emanate from the substrate into the environment and when in the closed form the protective material covers the substrate or matrix to minimise emanation of the pyrethroid into the environment.

51. A packaged flying insect control article comprising:

- a) a cellulosic based substrate or matrix with a surface area in the range of 50-5000 cm<sup>2</sup> impregnated and/or dosed with a solution of vapour active pyrethroid in an amount of approximately 2.0-3000 mg/m<sup>2</sup> in a carrier solvent, the cellulosic based substrate or matrix impregnated and/or dosed with the vapour active pyrethroid in an amount such that the vapour active pyrethroid is emanated into a non-augmented environment at a rate of at least approximately 0.040 mg/h at a temperature in the range of approximately 18-40°C; and
- b) a packaging material enclosing the cellulosic based substrate or matrix into which material the vapour active pyrethroid does not migrate and/or is not absorbed;

wherein the protective material and packaging material is selected from the group including metalised polyester, heat sealed polyester films, polyester based film and formed sheet and acrylonitrile-methyl acrylate copolymers and laminates thereof; metal foil and laminates thereof; and glass; and

such that when the packaging material enclosing the cellulosic based substrate or matrix is removed from around the cellulosic based substrate or matrix, the vapour active pyrethroid is free to emanate from the cellulosic based substrate or matrix exposed to the environment to control flying insects.

52. A packaged flying insect control article comprising:

- a) a cellulosic based substrate or matrix for controlling flying insects, the cellulosic based substrate or matrix impregnated and/or dosed with an insecticidally effective amount of a vapour active pyrethroid in a carrier solvent, such that the vapour active pyrethroid is emanated into the environment at a rate of at least approximately 0.040 mg/h; and
- b) a packaging material enclosing the cellulosic based substrate or matrix into which material the vapour active pyrethroid does not migrate and/or is not absorbed;

wherein the protective material and packaging material is selected from the group including metalised polyester, heat sealed polyester films, polyester based film and formed sheet and acrylonitrile-methyl acrylate copolymers and laminates thereof; metal foil and laminates thereof; and glass; and

such that when the packaging material enclosing the cellulosic based substrate or matrix is removed from around the cellulosic based substrate or matrix, the vapour active pyrethroid is free to emanate from the cellulosic based substrate or matrix exposed to the environment to control flying insects.

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53. A stable flying insect control article comprising:

a cellulosic based substrate or matrix with a surface area in the range of 50–5000 cm<sup>2</sup>, wet with a solution of vapour active pyrethroid in an amount of approximately 2.0–3000 mg/m<sup>2</sup> of the surface area and a carrier solvent, 10 enclosed by a packaging material;

wherein the protective material and packaging material is selected from the group including metalised polyester, heat sealed polyester films, polyester based film and formed sheet and acrylonitrile-methyl acrylate copolymers and laminates thereof; metal foil and laminates thereof; and glass; and

15 such that the vapour active pyrethroid emanates from the cellulosic substrate or matrix into a non-augmented environment at a rate of at least approximately 0.040 mg/h at a temperature in the range of approximately 18–40°C but does not migrate and/or is not absorbed into the packaging material.

20 54. A stable flying insect control article comprising:

a cellulosic based substrate or matrix wet with a solution of an insecticidally effective amount of a vapour active pyrethroid and a carrier solvent having an evaporation rate according to ASTM D3539-87 of less than approximately 1.0, a boiling point range at or above about 120°C to below about

25 300°C and a polarity index in the range of approximately 0.0–4.0, enclosed by a packaging material;

wherein the protective material and packaging material is selected from the group including metalised polyester, heat sealed polyester films, polyester based film and formed sheet and acrylonitrile-methyl acrylate copolymers and 30 laminates thereof; metal foil and laminates thereof; and glass; and

such that the vapour active pyrethroid emanates from the cellulosic substrate or matrix into the environment at a rate of at least approximately 0.040 mg/h but does not migrate and/or is not absorbed into the packaging material.

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55. A method for controlling flying insects comprising the steps of:

- a) providing the cellulosic based substrate or matrix or insect control article according to any one of claims 1 to 54;
- b) exposing the cellulosic based substrate or matrix in an environment with non-augmented air movement; and

5 c) allowing the vapour active pyrethroid impregnated within and/or dosed on the cellulosic based substrate or matrix to passively emanate into the air.

10 56. The insect control article of anyone of claims 23-54 and the method according to claim 55 wherein the vapour active pyrethroid emanates into the atmosphere to knockdown flying insects.

57. The insect control article of anyone of claims 23-54 and the method according to claim 55 wherein the flying insects are mosquitoes.

15 58. A method of packaging a cellulosic based substrate or matrix or insect control article according to any one of claims 1 to 54 comprising the steps of:

- a) providing a packaging material through which the vapour active pyrethroid does not migrate and/or is not absorbed;
- b) forming a pouch with the packaging material;

20 c) filling the pouch with the cellulosic based substrate or matrix or insect control article; and

d) sealing the pouch.

25 59. The method according to claim 58 wherein the packaging material is selected from the group consisting of metalised polyester, heat sealed polyester films, polyester based film and formed sheet and acrylonitrile-methyl acrylate copolymers and laminates thereof, metal foil and laminates thereof and glass.